Program/Abstract #393
Epidermal wound response activators and mechanisms of control
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A break in the epidermal barrier elicits a wide range of responses, including clot formation, reepithelialization, cell proliferation, inflammation, and barrier replacement. As a first line of defense, an organism must not only initiate a wound response but also coordinate the wound signals around the site of injury. Failure to properly control the wound response can alter survival after injury. To better understand what signals promote wound healing we are testing chemical compounds as potential activators of an epidermal wound response. The Drosophila embryo provides an excellent system to both injure and detect activation of wound response with fluorescent reporters. Using a micro-pipette we simultaneously wound and deliver the chemical compounds to the embryo. Results identify that cholesterol depletion, oxidation, and serine protease treatments can activate a wound response throughout the epidermis of the Drosophila embryo. Combining the chemical compound tests with results from a genetic screen provides insights into the mechanisms that control the epidermal wound response. Using Drosophila to determine factors that coordinate the activation of the epidermal wound response and the signaling that occurs between cells at the site of injury brings new understanding to a complex problem faced by all multi-cellular organisms.

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Program/Abstract #394
Characterizing the cellular process of renal repair in the *Xenopus laevis* pronephric kidney
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Renal systems are critical for maintaining homeostatic equilibria within organisms, and thus repair of damaged nephric structures is possible with varying capacity among vertebrates. Mammalian kidney repair is mostly limited to increases in size of undamaged nephrons to compensate for injury to other nephrons. In adult fish, renal repair is much more extensive, with neonephrogenesis occurring in response to both chemotoxic and mechanical injuries. However, very little is known about the mechanisms by which these renal restorative events take place. Our lab is interested in characterizing the renal repair response after partial nephrectomy in the amphibian pronephros (embryonic kidney), a simple renal system which develops under similar inductive processes as the adult fish (mesonephric) and the adult mammalian (metanephric) kidneys. Mechanical injury induced via partial nephrectomy of pronephric tubules is reminiscent of physical damage experienced by patients with kidney tumors and infections. Thus the information acquired during this research may also be applicable to therapeutic alternatives in the treatment of many causes of human renal dysfunction. Our recent research demonstrates the ability of a tadpole to replace previously excised renal tissues with structures that morphologically resemble pronephric tubules. Furthermore, these 'restored' structures also express genes normally observed in functional pronephroi. Currently we are characterizing the cellular events, such as apoptosis and proliferation, which give rise to this tubule restoration phenomenon.

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Program/Abstract #396
Examination of stem cells, regeneration, and gut development in the sea anemone *Nematostella vectensis*
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We have been examining several aspects of the biology of the Cnidarian *Nematostella vectensis*, a basal-branching Metazoan, which possesses the ability to regenerate its entire body from small stumps of amputated tissue. It is yet unknown whether stem cells contribute to this process. We have been examining the expression during regeneration of several orthologs of genes commonly associated with stem cells in vertebrates. Reverse Transcriptase PCR results suggest that several of these putative 'stem cell markers' demonstrate increased expression in the hours immediately following amputation. Possibilities such as whether dedifferentiation and subsequent transdifferentiation of terminally differentiated cells or proliferation of a pool of native stem cells are contributing to this process are being explored. Additionally, we have been assaying expression of many bilaterian fore- mid- and hind-gut marker orthologs during anemone development to determine whether *Nematostella*, whose body consists of a morphologically uniform columnar trunk cavity, possesses a molecularly compartmentalized gut.

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Program/Abstract # 398
Profiling the molecular, cellular and extracellular programs of vertebrate heart regeneration
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Unlike mammals, certain vertebrates such as newts and zebrafish possess extraordinary abilities to regenerate numerous lost or injured structures without compromising the functional architecture of the repaired tissue. Utilizing these naturally regeneration-competent species, we aim to discover the underpinning molecular and cellular mechanisms that regulate complex tissue rebuilding. Here, we present experimental evidence that the extracellular matrix (ECM) provides signals to tissues and cells essential for the induction and maintenance of regenerative processes. Using a custom-designed newt microarray, we have identified the gene activities that define